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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: A. Yamamoto et al. : Art Unit:  
Serial No.: To Be Assigned : Examiner:  
Filed: Herewith :  
FOR: ANTENNA, ANTENNA DEVICE, :  
AND RADIO EQUIPMENT :

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, D.C. 20231

S I R :

Prior to examination, please amend the above-identified application  
as follows:

IN THE DRAWINGS:

Please enter the corrections to Figs. 6(a) and 6(B) as shown in the  
red ink sketch submitted herewith.

SPECIFICATION:

Please replace the paragraph beginning at page 8, line 20, with the  
following:

One aspect of the present invention is an antenna comprising:

Please replace the paragraph beginning at page 9, line 5, with the  
following:

Another aspect of the present invention is the antenna, wherein the bottom member is grounded as a ground conductor.

Please replace the paragraph beginning at page 9, line 8, with the following:

Still another aspect of the present invention is the antenna, wherein the bottom member has a feeding point on a surface thereof.

Please replace the paragraph beginning at page 9, line 11, with the following:

Yet another aspect of the present invention is the antenna, wherein the conductive member and the bottom member are connected to each other in a place other than the signal line the feeding point.

Please replace the paragraph beginning at page 9, line 15, with the following:

Still yet another aspect of the present invention is the antenna, wherein the conductive member and the side member are connected to each other.

Please replace the paragraph beginning at page 9, line 18, with the following:

A further aspect of the present invention is the antenna further comprising:

Please replace the paragraph beginning at page 9, line 22, with the following:

A still further aspect of the present invention is the antenna, wherein the conductive member and the ceiling member are connected to each other electrically and/or mechanically.

Please replace the paragraph beginning at page 10, line 3, with the following:

A yet further aspect of the present invention is the antenna, wherein the ceiling member and the side member are connected to each other electrically.

Please replace the paragraph beginning at page 10, line 6, with the following:

A still yet further aspect of the present invention is the antenna, wherein the ceiling member has a periphery having a curved shape.

Please replace the paragraph beginning at page 10, line 9, with the following:

An additional aspect of the present invention is the antenna, wherein the bottom member and/or the side member have openings.

Please replace the paragraph beginning at page 10, line 12, with the following:

A still additional aspect of the present invention is the antenna, wherein the ceiling member has openings.

Please replace the paragraph beginning at page 10, line 15, with the following:

A yet additional aspect of the present invention is the antenna, wherein the openings have means of adjusting their size.

Please replace the paragraph beginning at page 10, line 18, with the following:

A still yet additional aspect of the present invention is the antenna, wherein, if it is assumed that a projection of the conductive member onto the bottom member is an origin point and the bottom member is arranged in an X-Y plane, the bottom member and the side member are symmetric with respect to a Z-Y plane, and the openings are symmetrically arranged with respect to a Z-Y plane.

Please replace the paragraph beginning at page 11, line 1, with the following:

A supplementary aspect of the present invention is the antenna, wherein the bottom member and the side member are symmetric with respect to a Z-X plane, and the openings are symmetrically arranged with respect to a Z-X plane.

Please replace the paragraph beginning at page 11, line 6, with the following:

A still supplementary aspect of the present invention is the antenna, comprising a dielectric member that has a permittivity higher than air and is provided in the space.

Please replace the paragraph beginning at page 11, line 10, with the following:

A yet supplementary aspect of the present invention the antenna, wherein the dielectric member is provided at least so as to cover a part of the space which is not covered with the ceiling conductor.

Please replace the paragraph beginning at page 11, line 14, with the following:

A still yet supplementary aspect of the present invention is the antenna, wherein the dielectric member fills the entire inside of the space.

Please replace the paragraph beginning at page 11, line 17, with the following:

One aspect of the present invention the antenna, wherein the dielectric member has a via hole, and the side member consists of the via hole.

Please replace the paragraph beginning at page 11, line 20, with the following:

Another aspect of the present invention is the antenna, further comprising at least one matching element which is arranged apart by a predetermined distance from the conductive member, wherein the matching element and the bottom member are connected to each other electrically.

Please replace the paragraph beginning at page 12, line 3, with the following:

Still another aspect of the present invention is the antenna, wherein at least one of the matching elements is electrically connected to the conductive member.

Please replace the paragraph beginning at page 12, line 7, with the following:

Yet another aspect of the present invention is the antenna, wherein at least one of the matching elements is electrically connected to the ceiling member and/or the side member.

Please replace the paragraph beginning at page 12, line 11, with the following:

Still yet another aspect of the present invention is an arrangement method of antennas that is an arrangement method of the antennas, comprising a step of aligning and arranging the plural antennas in a manner to conform a direction for minimizing directivity of each of the antennas on a horizontal plane.

Please replace the paragraph beginning at page 12, line 17, with the following:

A further aspect of the present invention is an antenna device comprising:

all or part of a circuit for transmission and/or reception which is connected to the signal line while being arranged in the space.

Please replace the paragraph beginning at page 12, line 23, with the following:

A still further aspect of the present invention is the antenna device, further comprising a shielding member of covering all or part of the circuit, wherein the shielding member does not contact to the conductive member electrically.

Please replace the paragraph beginning at page 13, line 4, with the following:

A yet further aspect of the present invention is the antenna device, wherein the shielding member is formed as a concave portion that is each part of the bottom member and/or the side member; and

wherein all or part of the circuit is arranged in the concave portion.

Please replace the paragraph beginning at page 13, line 10, with the following:

A still yet further aspect of the present invention is the antenna device, further comprising a lid member which covers the concave portion and stores all or part of the circuit, wherein the lid member is electrically connected to the bottom member and/or the side member.

Please replace the paragraph beginning at page 13, line 15, with the following:

An additional further aspect of the present invention is the antenna device, wherein the circuit is constituted with a passive circuit.

Please replace the paragraph beginning at page 13, line 18, with the following:

A still additional further aspect of the present invention is the antenna device, wherein an active element is contained in the circuit.

Please replace the paragraph beginning at page 13, line 21, with the following:

A yet additional further aspect of the present invention is the antenna device, wherein a microwave circuit is contained in the circuit.

Please replace the paragraph beginning at page 14, line 1, with the following:

A still yet additional aspect of the present invention is the antenna device, wherein an optical passive element is contained in the circuit.

Please replace the paragraph beginning at page 14, line 4, with the following:

A supplementary aspect of the present invention is the antenna device, wherein an optical active element is contained in the circuit.

Please replace the paragraph beginning at page 14, line 7, with the following:

A still supplementary aspect of the present invention is the antenna device, wherein the circuit has an IC.

Please replace the paragraph beginning at page 14, line 10, with the following:

A yet supplementary aspect of the present invention is the antenna device wherein the circuit has such size that the circuit is hidden behind the ceiling member, when viewing the antenna device from the ceiling member, side in the direction perpendicularly to the ceiling member.

Please replace the paragraph beginning at page 14, line 15, with the following:



A still yet supplementary aspect of the present invention is an array antenna device that is an array antenna device where the plural antenna devices are arrayed, wherein the circuits in the plural antenna devices each input or output the same signal.

Please replace the paragraph beginning at page 14, line 20, with the following:

Another aspect of the present invention is the array antenna device, wherein the circuit has a cartridge form so as to be detachable from the antenna.

Please replace the paragraph beginning at page 14, line 23, with the following:

Still another aspect of the present invention is the antenna device, wherein the circuit comprises plural sub-circuits having radio systems different from each other, and switching means of switching the connection between anyone of the sub-circuits an the antenna.

Please replace the paragraph beginning at page 15, line 4, with the following:

Yet another aspect of the present invention is the antenna device, wherein the circuit is arranged in the position that hides the circuit behind the ceiling member, when viewing the antenna device from the ceiling member side in the direction perpendicularly to the ceiling member.

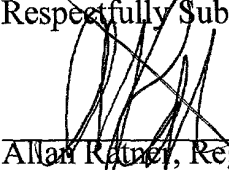
Please replace the paragraph beginning at page 15, line 10, with the following:

Still yet another aspect of the present invention is the antenna device, wherein the circuit comprises: amplification means of amplifying the signal for the transmission and/or reception; and frequency selection means of selecting a frequency of the signal for transmission or the signal for reception.

Please replace the paragraph beginning at page 15, line 16, with the following:

A further aspect of the present invention is a radio equipment comprising the antenna device, and a power supply circuit provided in the circuit.

Respectfully Submitted,

  
Allan Ratner, Reg. No. 19,717  
Attorney for Applicants

AR/dlm

Enclosures: Version with markings to show changes made


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Kathleen Libby

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

SPECIFICATION:

Specification at page 8, line 20:

~~The 1st invention~~ One aspect of the present invention is an antenna comprising:

Specification at page 9, line 5:

~~The 2nd invention~~ Another aspect of the present invention is the antenna ~~according to 1st invention~~, wherein the bottom member is grounded as a ground conductor.

Specification at page 9, line 8:

~~The 3rd invention~~ Still another aspect of the present invention is the antenna ~~according to 1st invention~~, wherein the bottom member has a feeding point on a surface thereof.

Specification at page 9, line 11:

~~The 4th invention~~ Yet another aspect of the present invention is the antenna ~~according to 1st or 3rd inventions~~, wherein the conductive member and the bottom member are connected to each other in a place other than the signal line the feeding point.

Specification at page 9, line 15:

~~The 5th invention~~ Still yet another aspect of the present invention is the antenna ~~according to 1st invention~~, wherein the conductive member and the side member are connected to each other.

Specification at page 9, line 18:

~~The 6th invention~~ A further aspect of the present invention is the antenna ~~according to 1st invention~~ further comprising:

Specification at page 9, line 22:

~~The 7th invention~~ A still further aspect of the present invention is the antenna ~~according to 6th invention~~, wherein the conductive member and the ceiling member are connected to each other electrically and/or mechanically.

Specification at page 10, line 3:

~~The 8th invention~~ A yet further aspect of the present invention is the antenna ~~according to 6th invention~~, wherein the ceiling member and the side member are connected to each other electrically.

Specification at page 10, line 6:

~~The 9th invention~~ A still yet further aspect of the present invention is the antenna ~~according to 6th invention~~, wherein the ceiling member has a periphery having a curved shape.

Specification at page 10, line 9:

~~The 10th invention~~ An additional aspect of the present invention is the antenna ~~according to 1st invention~~, wherein the bottom member and/or the side member have openings.

Specification at page 10, line 12:

~~The 11th invention~~ A still additional aspect of the present invention is the antenna ~~according to 6th invention~~, wherein the ceiling member has openings.

Specification at page 10, line 15:

~~The 12th invention~~ A yet additional aspect of the present invention is the antenna ~~according to 10th or 11th invention~~, wherein the openings have means of adjusting their size.

Specification at page 10, line 18:

~~The 13th invention~~ A still yet additional aspect of the present invention is the antenna ~~according to 11th invention~~, wherein, if it is assumed that a projection of the conductive member onto the bottom member is an origin point and the bottom member is arranged in an X-Y plane, the bottom member and the side member are symmetric with respect to a Z-Y plane, and the openings are symmetrically arranged with respect to a Z-Y plane.

Specification at page 11, line 1:

~~The 14th invention~~ A supplementary aspect of the present invention is the antenna ~~according to 13th invention~~, wherein the bottom member and the side member are symmetric with respect to a Z-X plane, and the openings are symmetrically arranged with respect to a Z-X plane.

Specification at page 11, line 6:

~~The 15th invention~~ A still supplementary aspect of the present invention is the antenna ~~according to 1st or 6th inventions~~, comprising a dielectric member that has a permittivity higher than air and is provided in the space.

Specification at page 11, line 10:

~~The 16th invention~~ A yet supplementary aspect of the present invention the antenna ~~according to 15th invention~~, wherein the dielectric member is provided at least so as to cover a part of the space which is not covered with the ceiling conductor.

Specification at page 11, line 14:

~~The 17th invention~~ A still yet supplementary aspect of the present invention is the antenna ~~according to 15th invention~~, wherein the dielectric member fills the entire inside of the space.

Specification at page 11, line 17:

~~The 18th invention~~ One aspect of the present invention the antenna ~~according to 17th invention~~, wherein the dielectric member has a via hole, and the side member consists of the via hole.

Specification at page 11, line 20:

~~The 19th invention~~ Another aspect of the present invention is the antenna ~~according to 1st or 6th inventions~~, further comprising at least one matching element which is arranged apart by a predetermined distance from the conductive member, wherein the matching element and the bottom member are connected to each other electrically.

Specification at page 12, line 3:

~~The 20th invention~~ Still another aspect of the present invention is the antenna ~~according to 19th invention~~, wherein at least one of the matching elements is electrically connected to the conductive member.

Specification at page 12, line 7:

~~The 21st invention~~ Yet another aspect of the present invention is the antenna ~~according to 19th invention~~, wherein at least one of the matching elements is electrically connected to the ceiling member and/or the side member.

Specification at page 12, line 11:

~~The 22nd invention~~ Still yet another aspect of the present invention is an arrangement method of antennas that is an arrangement method of the antennas ~~according to 1st invention~~, comprising a step of aligning and arranging the plural antennas in a manner to conform a direction for minimizing directivity of each of the antennas on a horizontal plane.

Specification at page 12, line 17:

~~The 23rd invention~~ A further aspect of the present invention is an antenna device comprising:

~~the antenna according to 1st or 6th inventions; and~~ all or part of a circuit for transmission and/or reception which is connected to the signal line while being arranged in the space.

Specification at page 12, line 23:

~~The 24th invention~~ A still further aspect of the present invention is the antenna device ~~according to 23rd invention~~, further comprising a shielding member of covering all or part of the circuit, wherein the shielding member does not contact to the conductive member electrically.

Specification at page 13, line 4:

~~The 25th invention of the present invention is 25.~~

A yet further aspect of the present invention is the ~~The antenna device according to 24th invention~~, wherein the shielding member is formed as a concave portion that is each part of the bottom member and/or the side member; and

wherein all or part of the circuit is arranged in the concave portion.

Specification at page 13, line 10:

~~The 26th invention~~ A still yet further aspect of the present invention is the antenna device ~~according to 25th invention~~, further comprising a lid member which covers the concave portion and stores all or part of the circuit, wherein the lid member is electrically connected to the bottom member and/or the side member.

Specification at page 13, line 15:

~~The 27th invention~~ An additional further aspect of the present invention is the antenna device according to 23rd invention, wherein the circuit is constituted with a passive circuit.

Specification at page 13, line 18:



~~The 28th invention~~ A still additional further aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein an active element is contained in the circuit.

Specification at page 13, line 21:

~~The 29th invention~~ A yet additional further aspect of the present invention is ~~29~~.

~~The the~~ antenna device ~~according to 23rd invention~~, wherein a microwave circuit is contained in the circuit.

Specification at page 14, line 1:

~~The 30th invention~~ A still yet additional aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein an optical passive element is contained in the circuit.

Specification at page 14, line 4:

~~The 31st invention~~ A supplementary aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein an optical active element is contained in the circuit.

Specification at page 14, line 7:

~~The 32nd invention~~ A still supplementary aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein the circuit has an IC.

Specification at page 14, line 10:

~~The 33rd invention~~ A yet supplementary aspect of the present invention is the antenna device ~~according to 23rd invention~~ wherein the circuit has such size that the circuit is hidden behind the ceiling member, when viewing the antenna device from the ceiling member, side in the direction perpendicularly to the ceiling member.

Specification at page 14, line 15:

~~The 34th invention~~ A still yet supplementary aspect of the present invention is an array antenna device that is an array antenna device where the plural antenna devices ~~according to 23rd invention~~ are arrayed, wherein the circuits in the plural antenna devices each input or output the same signal.

Specification at page 14, line 20:

~~The 35th invention~~ Another aspect of the present invention is the array antenna device ~~according to 23rd invention~~, wherein the circuit has a cartridge form so as to be detachable from the antenna.

Specification at page 14, line 23:

~~The 36th invention~~ Still another aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein the circuit comprises plural sub-circuits having radio systems different from each other, and switching means of switching the connection between anyone of the sub-circuits an the antenna.

Specification at page 15, line 4:

~~The 37th invention~~ Yet another aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein the circuit is arranged in the position that hides the circuit behind the ceiling member, when viewing the

antenna device from the ceiling member side in the direction perpendicularly to the ceiling member.

Specification at page 15, line 10:

~~The 38th invention~~ Still yet another aspect of the present invention is the antenna device ~~according to 23rd invention~~, wherein the circuit comprises: amplification means of amplifying the signal for the transmission and/or reception; and frequency selection means of selecting a frequency of the signal for transmission or the signal for reception.

Specification at page 15, line 16:

~~The 39th invention~~ A further aspect of the present invention is a radio equipment comprising the antenna device ~~according to any one of 23rd to 38th inventions~~, and a power supply circuit provided in the circuit.

Fig. 6 (A)

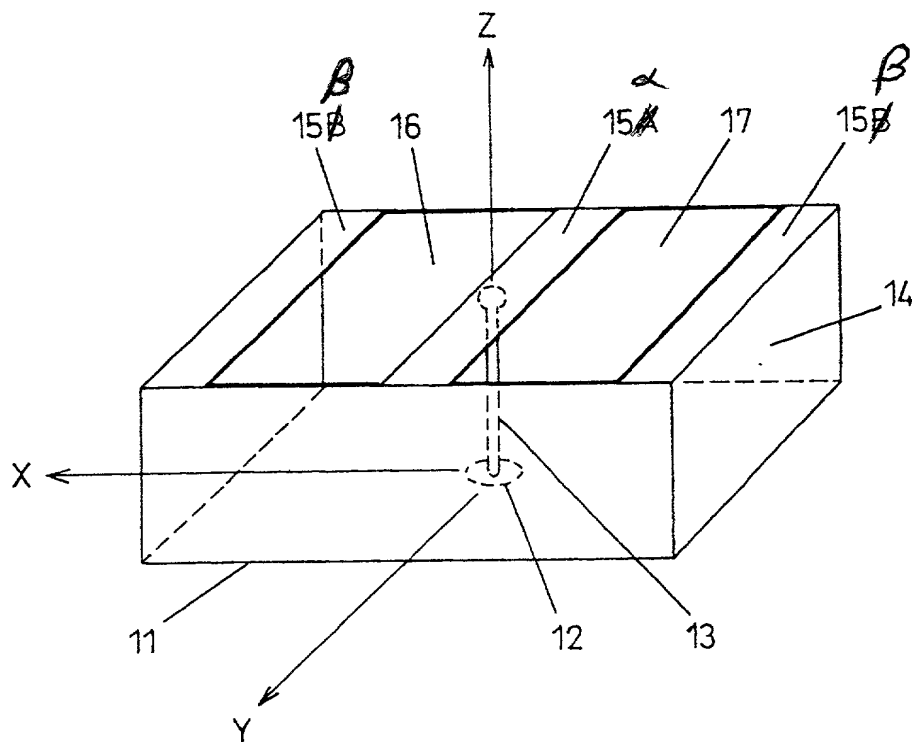


Fig. 6 (B)

